



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Dry Prong, LA	<b>Accident Number:</b>	DFW07FA007
<b>Date &amp; Time:</b>	10/22/2006, 1648 CDT	<b>Registration:</b>	N64GK
<b>Aircraft:</b>	Piper PA-32R-300	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>		<b>Injuries:</b>	1 Fatal, 3 Serious, 1 Minor
<b>Flight Conducted Under:</b> Part 91: General Aviation - Personal			

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## Analysis

The flight instructor was acting as pilot-in-command of the cross-country flight in the student pilot's airplane with the student and three passengers. The instructor related that the engine oil level prior to departure was 9 quarts, and that the oil on the dipstick was clean. While in cruise flight, the low oil pressure warning light flickered, and the oil pressure dropped. The instructor elected to continue the flight after a discussion with the student pilot, and after monitoring other engine gauges and determining that the engine was running smoothly. About 20 minutes later, the engine made a "slight clatter noise" and the instructor elected to divert to a closer airport. Shortly thereafter, there was a loud "bang" and the engine seized. A forced landing was made to a small pasture, during which the airplane collided with a fence and trees. Inspection of the airplane revealed no oil on the top of the cowl and windshield. Oil was found on the bottom of the cowl and in trail on the bottom of the fuselage. Examination of the engine disclosed evidence of internal catastrophic failure consistent with a lack of sufficient lubrication.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:  
The loss of engine power during cruise flight due to oil starvation, resulting in an emergency

off-airport forced landing. A factor associated with the accident was the instructor's improper in-flight decision in delaying to seek an emergency landing site following a loss of oil pressure indication.

## Findings

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Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - MECH FAILURE/MALF  
Phase of Operation: CRUISE

### Findings

1. (C) FLUID,OIL - STARVATION
2. (F) IN-FLIGHT PLANNING/DECISION - IMPROPER - PILOT IN COMMAND(CFI)

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Occurrence #2: FORCED LANDING  
Phase of Operation: DESCENT - EMERGENCY

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Occurrence #3: IN FLIGHT COLLISION WITH OBJECT  
Phase of Operation: EMERGENCY DESCENT/LANDING

### Findings

3. OBJECT - FENCE

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Occurrence #4: ON GROUND/WATER COLLISION WITH OBJECT  
Phase of Operation: EMERGENCY DESCENT/LANDING

### Findings

4. OBJECT - TREE(S)
5. TERRAIN CONDITION - NONE SUITABLE

## Factual Information

### HISTORY OF FLIGHT

On October 22, 2006, at 1648 central daylight time, a single-engine Piper PA-32R-300 airplane, N64GK, was substantially damaged during a forced landing to a field near Dry Prong, Louisiana, following a loss of engine power. The airline transport pilot was not injured, the student pilot and two passengers sustained serious injuries, and the other passenger was fatally injured. The airplane was registered to and operated by the student pilot. An instrument flight rules flight plan was filed for the flight that departed the M. Graham Clark-Taney County Airport (PLK), near Point Lookout, Missouri, about 1450, and was destined for the Alexandria International Airport (AEX), near Alexandria, Louisiana. Visual meteorological conditions prevailed for the personal flight conducted under 14 Code of Federal Regulations Part 91.

The pilot reported that he had flown the airplane for two to three years prior to the accident, and added that the student pilot had purchased the airplane approximately one year earlier. He said that the owner was actively taking flying lessons, but was not certificated, so he would ask the pilot to fly with him on different occasions. On this occasion, the owner asked the pilot to accompany him and his family to their lake home near Branson, Missouri. The trip originated on October 20, 2006, in Alexandria, and was terminated in Point Look Out, Missouri. The flight's duration was approximately 2 hours and 19 minutes.

On the morning of October 22, 2006, in preparation to for the return flight to Alexandria, the pilot conducted a preflight inspection of the airplane, which included checking the oil level. He said the airplane normally used approximately one quart of oil per every 3 to 5 hours of flight, and he was not surprised when the airplane had used approximately one quart of oil on their trip from Alexandria to Point Lookout. The pilot added one quart to bring the oil level to just over 9 quarts. The oil was translucent in color and he had to hold the dipstick up to the light to confirm the oil level. Because it was cold, the pilot did not want to dispose of the empty oil container at the airport, so he placed it in the forward baggage compartment instead. The pilot also stated that there was no sign of oil leakage on the ground and there were no oil streaks noted anywhere on the fuselage of the airplane.

In a written statement, the pilot stated that the return flight to Alexandria was uneventful until the flight was approximately 20 miles northwest of Ruston, Louisiana, about an hour and 30 minutes into the flight. He reported, "while en route IFR at 9,000 [feet altitude mean sea level] we had an indication of a loss of oil pressure northwest of KRSN (Ruston Louisiana), I cancelled IFR and requested flight following and began a turn toward Ruston to monitor and evaluate the problem. About 8 to 10 minutes later, when approaching Ruston at approx[imately] 4,500 feet we still had no other supporting indications. We still had full control of the propeller and the oil and cylinder head temp[erature] had remained constant and very cool. The engine was running very smooth. The owner stated that he had had the fuel pressure indicator changed recently and the oil had also been changed recently. The conclusion was that we had an indication error since there were no other symptoms to support the oil pressure indication." About 20 minutes later, the oil light flickered again and they heard a "slight clatter noise" from the engine, and the pilot and owner decided to land at Pollack Airport, north of Alexandria. As soon as they started toward Pollack Airport, the engine made a "loud bang", the propeller seized and the engine stopped producing power. The student pilot, who was flying from the left seat, reported that the oil pressure gauge indicated

only a slight drop, but remained within normal parameters until they heard the "loud bang" when the pressure dropped to "o."

The pilot took control of the airplane and asked an air traffic controller for the location of the nearest suitable airport. The pilot was told that Pollack was approximately 10 miles away and Interstate 49 was 6 miles away. The pilot knew that he did not have enough altitude (3,500 feet mean sea level) to make either one, so he elected to land in a small pasture that was surrounded by trees. The pilot commented that he knew that he did not have enough room to land the airplane safely. On final approach to the field, the pilot extended the landing gear as the airplane crossed over a large group of approximately 124-foot-tall trees. As the airplane flew over the trees, the pilot extended the landing gear. When the airplane was clear of the trees, he extended the flaps to 40 degrees. Prior to touching down, the airplane struck a barbed-wire fence with its landing gear. After it struck the fence, the pilot forced the airplane onto the ground nose wheel first. The nose of the airplane then swerved to the right and inertia carried the airplane in the original direction of landing as it skidded across the uneven terrain, impacted a second fence, then crossed over a dirt driveway and subsequently collided with trees.

#### PERSONNEL INFORMATION

The pilot held an airline transport pilot certificate for airplane single and multi-engine land, and instrument airplane. He was also a flight instructor for airplane single and multi-engine land, and instrument airplane. The pilot also held several type ratings. The pilot's last FAA second-class medical was issued on September 20, 2006. The pilot reported a total time of 8,000 hours, 1,600 hours in single-engine airplane; of which, 200 hours were in the same make and model as the accident airplane.

#### AIRCRAFT INFORMATION

A review of the airplane's maintenance logbooks indicated that the airplane's last annual inspection was completed on May 18, 2006, at a total aircraft time of 3,555.3 hours. At the time of the accident, the airplane had accrued an additional 63.5 hours.

Further review of the maintenance records, which included the Airworthiness Directive (AD) Compliance Record, revealed that AD 96-12-07 had not been complied with per Title 14 Code of Federal Regulations part 39, subpart 39.3. According to federal regulation, no person may operate an aircraft, to which an AD applies, except in accordance with the requirements of the AD. The registered owner stated that he was not aware that the AD had not been complied with at the last annual inspection.

#### METEOROLOGICAL INFORMATION

Weather reported at the Alexandria International Airport (AEX), Alexandria, Louisiana, at 1653, was reported as wind from 010 degrees at 6 knots, visibility 10 statute miles, clear skies, temperature 19 degrees C, dewpoint 5 degrees C, and a barometric pressure setting of 30.14 inches of Mercury.

#### WRECKAGE INFORMATION

An on-scene examination of the airplane wreckage was conducted at the accident site on October 23-24, 2006. All major components of the airplane were accounted for at the scene. The airplane came to rest upright in a heavily wooded area adjacent to a dirt driveway on a heading of approximately 130 degrees at a field elevation of approximately 93 feet msl.

The fuselage exhibited impact damage on its left side near the door where it collided with a large tree. An external examination of the top portion of the engine cowling and the windscreen revealed there was no oil splatter or residue. However, there was some light oil residue on the bottom of the engine cowling that traveled back along the belly of the fuselage.

The left wing was separated near the wing root and was substantially damaged by impact with trees. The wing was found at the tree line where the impact occurred about 10 feet from the fuselage. The inboard fuel tank was breached and was absent of fuel. The outboard fuel tank contained about 3-4 gallons of light blue colored fuel.

The right wing was separated from the fuselage at the forward wing attachment point and was displaced upwards (near vertical) to the fuselage. The fuel tanks were breached and found empty.

Examination of the flap torque tube revealed that the flaps were extended to the full position (40 degrees). All three landing gear were found in the down and locked position.

The vertical stabilizer, rudder and horizontal stabilator remained attached to the fuselage and exhibited impact damage. The stabilator trim drum upper extension exposed 2.5 to 3 threads, which was consistent with a 40-50 percent nose down setting.

Flight control continuity was established for all flight control surfaces to the cockpit.

The engine remained attached to the fuselage, and the three-bladed propeller remained attached to the engine. All three blades were secure in the hub and appeared relatively undamaged.

External examination of the engine revealed a crack in the case over the number 6 cylinder. The left side exhaust stacks, the oil/air separator breather tube where it connected to an aluminum line, and also the dual magneto were covered with a thin coating of dark colored oil. The oil dipstick was secure to the engine.

The engine was disassembled and examined. There was fuel in the manifold and the screen was absent of debris. There was also fuel in the fuel pump and its respective lines.

The spark plugs were removed and appeared normal, except for the plugs installed on the number 5 cylinder, which were covered with soot.

The accessory case was removed and the oil pump was examined. Examination of the pump revealed scoring on the internal drum, and the suction screen had captured pieces of metal material. Flecks of shiny metal material were also found throughout the oil filter element.

The dual magneto was leaking oil from the two vents holes on either side of the housing. The housing was removed, and approximately 1/4-cup of dark oil was observed inside. The coils, gears and other components were oil covered and the drive shaft bearing could be moved sideways in the housing. A tooth was missing from one of the timing gears. The impulse coupling pawls were worn and rubbing against the oil slinger ring.

Approximately two-quarts of oil were drained from the oil sump. The oil was dark in color and smelled burned. In addition, large pieces of metal material, consistent in shape and color to the camshaft, were found in the oil sump.

The number 6 piston was stuck inside the cylinder, but the connecting rod was discolored and partially melted around the crankshaft bearing. Pieces of the number 6 connecting rod cap and

the upper/lower bearings were also found in the oil sump. The camshaft was broken with a 3-inch-long section missing above the number 6 connecting rod. The number 5 connecting rod was darker than normal in color.

The engine sustained extensive mechanical damage, consistent with a lack of lubrication.

## TESTS AND RESEARCH

### Gauges and Switches

The pressure switches and engine gauges were removed from the aircraft for testing. The Hobbs meter switch, which had been relocated to the front of the engine, was normally open and found to close at about 6 psi.

The oil pressure-warning switch was removed from its original location behind the instrument panel. The switch was a normal-closed-type and opened about 33 psi.

The oil pressure gauge was checked at 25, 60 and 90 psi, and found to be accurate within  $\pm 1$  psi.

No mechanical anomalies were noted with either switch or the gauge.

### Magneto

The dual magneto was tested at Teledyne Continental Motors examination facility, Mobile, Alabama, on December 6, 2006, under the supervision of a Safety Board investigator.

A review of the engine's history revealed that the magneto was delivered new to Lycoming and installed on the engine when it underwent a factory rebuild in 1998. A review of the aircraft logbooks indicates that the magneto received normal maintenance inspections during its history on this engine and had not been overhauled.

The purpose of the examination was to determine why the housing shaft was displaced and why the internal parts of the magneto were oil soaked. The examination revealed that all four-retainers screws and stop pins were properly secured, and the housing was not cracked. In addition, the ball bearing was secured in the housing with bearing mount compound and the ball bearing was full of grease. These findings precluded an oil leak at these locations.

Examination of the ball bearing inner diameter (ID) and corresponding shaft journal exhibited signs of frictional damage. The fit between the ball bearing and shaft was not a press-fit, as designed. Instead, it was a slip fit. The shaft and the inner race were designed to rotate together as a unit. The shaft journal and the ball bearing ID were measured. The shaft journal measured .6688. The dimension specification for a new shaft is .6692-.6695. The ball bearing ID was measured at .669, and the dimension for a new bearing ID is .6690 -.6693.

Wear signatures between the ball bearing and journal indicated there was relative motion brought on by friction between the bearing inner race and the oil slinger that was rubbing on the (stationary) housing and the wave washer. The wave washer was compressed flat such that it wore against the slinger not only at normal contact points, but also at one apex that formed a radial crack. The outer face of the wave washer also indicated wear against the flat washer, all of which suggests that the magneto shaft was displaced toward the housing. Wear marks on the impulse cam axle tips showed the displacement of the shaft exceeded the clearance between the axle tips and the oil slinger.

The magneto was partially reassembled and the length of the shaft and associated features

were measured. With the shaft loaded (by hand) forward, the length from the housing gasket face to the tip of shaft was 2.2305. According to TCM, the design limit for this feature was 2.250 (maximum). The length from the housing gasket face to outer disk surface of the impulse body measured 1.0725. The design limit for this feature was 1.018 to 1.081. The length from the housing gasket face to the outer drive dog surface of the impulse body measured 1.4755. According to TCM, the design limit for this feature was 1.439 - 1.510. Based on these measurements, the shaft and its related features were within design limits.

The cause for shaft displacement could not be determined.

#### ADDITIONAL INFORMATION

The wreckage was released to a representative of the owner's insurance company on May 9, 2007.

#### Pilot Information

<b>Certificate:</b>	Airline Transport; Flight Instructor; Commercial; Private	<b>Age:</b>	49, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-engine Land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 With Waivers/Limitations	<b>Last FAA Medical Exam:</b>	09/01/2006
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	08/01/2006
<b>Flight Time:</b>	8000 hours (Total, all aircraft), 200 hours (Total, this make and model), 7600 hours (Pilot In Command, all aircraft), 30 hours (Last 90 days, all aircraft), 10 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

#### Student Pilot Information

<b>Certificate:</b>	Student	<b>Age:</b>	54, Male
<b>Airplane Rating(s):</b>	None	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 3 With Waivers/Limitations	<b>Last FAA Medical Exam:</b>	08/01/2006
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	08/01/2006
<b>Flight Time:</b>	91 hours (Total, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Make:	Piper	Registration:	N64GK
Model/Series:	PA-32R-300	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	32R7780327
Landing Gear Type:	Retractable - Tricycle	Seats:	6
Date/Type of Last Inspection:	05/01/2006, Annual	Certified Max Gross Wt.:	3600 lbs
Time Since Last Inspection:	63.5 Hours	Engines:	1 Reciprocating
Airframe Total Time:	3618.8 Hours at time of accident	Engine Manufacturer:	Lycoming
ELT:	Installed, not activated	Engine Model/Series:	IO-540
Registered Owner:	Jimmie Deramus	Rated Power:	300 hp
Operator:	Jimmie Deramus	Operating Certificate(s) Held:	None

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	AEX, 89 ft msl	Distance from Accident Site:	
Observation Time:	1653 CDT	Direction from Accident Site:	
Lowest Cloud Condition:	Clear	Visibility	10 Miles
Lowest Ceiling:	None	Visibility (RVR):	
Wind Speed/Gusts:	6 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	10°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.14 inches Hg	Temperature/Dew Point:	19° C / 5° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Point Lookout, MO (PLK)	Type of Flight Plan Filed:	IFR
Destination:	Alexandria, LA (AEX)	Type of Clearance:	IFR; VFR Flight Following
Departure Time:	1450 CDT	Type of Airspace:	

## Wreckage and Impact Information

Crew Injuries:	1 Minor	Aircraft Damage:	Substantial
Passenger Injuries:	1 Fatal, 3 Serious	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	1 Fatal, 3 Serious, 1 Minor	Latitude, Longitude:	31.608889, -92.612222



## Administrative Information

Investigator In Charge (IIC):	Leah D Yeager	Report Date:	07/25/2007
Additional Participating Persons:	Richard Gordon; Baton Rouge FAA/FSDO		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> .		

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).